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SICKNESS AND ABSENTEEISM DURING 1919 IN A LARGE INDUSTRIAL ESTABLISHMENT.[1]

By DEAN K. BRUNDAGE, Assistant Statistician, United States Public Health Service.

How much working time is lost by employees?

What proportion of absenteeism is caused by sickness?

These and similar questions are of interest to industrial establishments which are endeavoring to improve the health of their employees and cut down the number of working days lost on account of illness. Up to the present time few concerns have kept the records necessary for the accurate determination of such facts. Knowledge of sickness incidence and severity among a company's employees only fairly recently has come to be considered a function of the medical or welfare department.

An eastern manufacturing company which has investigated the causes of absence from work among its 6,700 employees has permitted us the presentation of some of the facts that were uncovered, in the hope that the information may be helpful to organizations contemplating the collection and analysis of similar information. The statistics presented do not represent a complete analysis of disabling illness by any means, as information concerning even the nature of the illness causing disability was not given in the report, because their sickness record system was not fully developed prior to January, 1920; but even the partial analysis of the sickness experience of one company may throw light on matters which hitherto have been subjects of speculation only.

Method of Securing Information.

Through the services of visiting nurses, the company ascertains the cause of absence when an employee who fails to give notification of absence remains away from work for more than two days in succession. The clerical procedure to obtain the list of absentees to be visited is as follows:

Every morning the benefit department sends to each foreman a list of the employees under the foreman's supervision, who were not at work on the preceding day. The foreman looks over his list and indicates by symbols whether the worker is still absent, has returned to work, or has been removed from the pay roll. On the reverse side of the sheet he writes down the names of those absent on the present

[1] From the Statistical Office, United States Public Health Service.

day that are not included in the list, stating whether or not they are absent with permission and giving reasons for absence if known. Special cases to be investigated are marked (x), all others being deferred until after two days of absence before the visiting nurse calls to ascertain if the employee is ill and in need of the services of physician or nurse.

The company pays sickness and nonindustrial accident benefits to employees on the factory pay roll who are incapacitated for more than seven consecutive days by sickness or by accident occurring outside of working hours, provided the employee has been in the continuous service of the company for three months or more. In order, however, to receive benefits, the disabled employee must secure the services of a legally qualified physician within seven days after the sickness or injury occurs, and this proviso makes it possible in a large number of cases for the visiting nurse to obtain a physician's diagnosis of the ailment causing disability. Unfortunately the record as to diagnosis was incomplete for the year 1919.

The Principal Causes of Absence.

The above method of checking cases of sickness by listing all absences makes possible the determination of what proportion of total time lost from work is due to disabling sickness. Knowledge of this proportion is particularly informative to firms or sick benefit associations desiring an estimate of the reduction in absenteeism that might reasonably be expected from the operation of some form of benefit organization that takes into consideration the principle of prevention.

TABLE I.—*Absenteeism, according to principal causes, by employees on the factory pay roll of a large eastern manufacturing establishment during the year of 1919.*

Cause of absence.	Per cent of working time lost.[a]	Per cent of total lost time.[b]
All causes	5.65	100.0
Cases of sickness which caused disability for more than 2 consecutive working-days	1.78	31.5
Industrial accidents	.18	3.2
Nonindustrial accidents	.06	1.1
Personal reasons and sickness of less than 3 days' duration	3.63	64.2

[a] Obtained by multiplying the average number of employees during the year (6,748) by the number of days which the factory operated (302), and then dividing the product into the number of days of absence for each principal cause.
[b] Ratio of days lost for each principal cause of absence to days lost for all causes.

Cases of sickness, it is seen, which lasted longer than two consecutive days constituted 31.5 per cent of all lost time. Because absences of less than three days' duration were not investigated, the *exact* proportion of absenteeism caused by all cases of disabling sickness can not be computed in the present instance, and there is no very satisfactory way of estimating what the percentage would be if sickness of one and two days' duration were included. Judging, how-

ever, from the experience of a company which has worked out the percentage of total time lost on account of cases lasting one and two days, the statement may be ventured that in the eastern factory under consideration all cases of disabling illness probably did not constitute more than 33 per cent of total lost time during the year, and that purely personal reasons accounted for about 62 per cent of lost time. Doubtless there is considerable variation in different manufacturing plants in the percentage of absenteeism caused by sickness, and whether 33 per cent is low or high or average is of course undeterminable until the time lost by the employees of other industrial establishments has been made known.

The working time lost for all causes of absence by the 6,748 employees (average number for the year) totaled more than 115,000 working-days, the equivalent of 384 years of work. In terms of time lost per employee this means 17.1 working-days, of which 5.4 days were due to cases of sickness that disabled for more than two consecutive working-days, one-half of a day on account of industrial accidents, one-fifth of a day due to nonindustrial injuries, and the balance, or 11 days, for personal reasons and for illnesses of less than three days' duration.

From surveys of actual sickness in industrial communities and from records of disability among employees of establishments, it has been estimated that the average number of days of disabling sickness per wage earner is between seven and nine for a 300-day working year. Compared with this estimate, the company's sickness severity rate is low to a gratifying degree.

Seasonal Variation of Sickness and Absenteeism.

An interesting variation in time losses from month to month is shown in Figure 1.

TABLE II.—*Per cent of working-time lost, by months, by employees of a large industrial establishment during 1919.*

Month.	Per cent of working-time lost on account of—				
	All causes of absence.	Sickness.[a]	Personal reasons.[b]	Industrial accidents.	Nonindustrial accidents.
January	5.39	1.51	3.50	0.28	0.10
February	5.14	1.64	3.27	.17	.06
March	6.27	2.13	3.88	.20	.06
April	6.95	2.54	4.27	.02	.03
May	7.69	1.78	5.65	.16	.10
June	4.70	1.60	2.90	.10	.10
July	4.72	1.39	3.10	.16	.07
August	5.13	1.51	3.34	.19	.07
September	5.71	1.79	3.77	.14	.....
October	5.80	1.80	3.70	.20	.10
November	5.20	1.67	3.29	.21	.03
December	6.03	2.01	3.82	.15	.05
Year	5.65	1.78	3.63	.18	.06

[a] Includes only those cases which caused disability for more than two consecutive working days.
[b] Includes cases of sickness of less than three (work) days' duration.

The fact that the peak of absenteeism was reached in May when absence for personal reasons became nearly twice as great as in the two months which followed, indicates that there *may be* a distinct

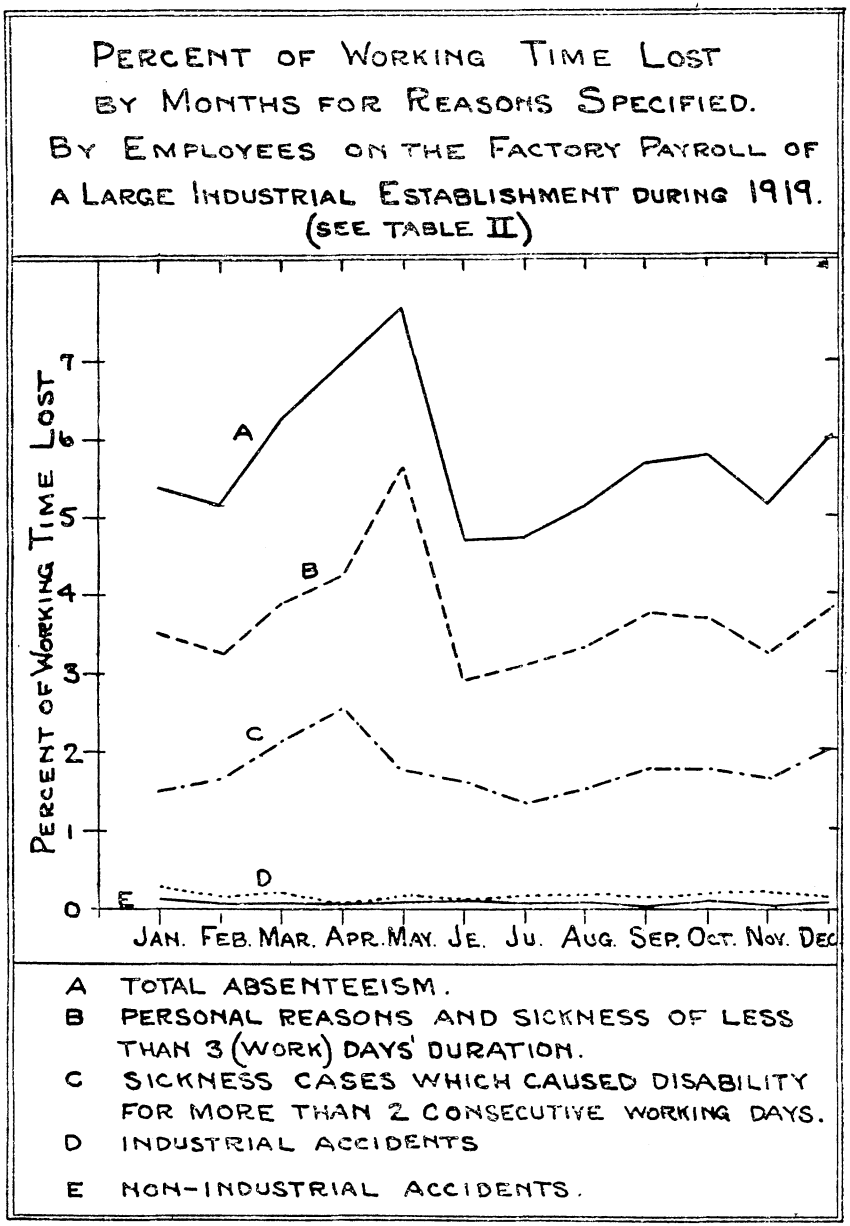

FIG. 1.

tendency for wage-earners to take a vacation in the spring and to remain on the job more faithfully immediately afterwards than at any other time throughout the year. Perhaps the "call of the Red Gods,"

as Kipling personifies the "old spring fret" that urges us to get into the country, is no mere poetic fancy, but a force that affects a considerable section of society.

In April occurred the highest percentage of working time lost on account of cases of sickness which lasted longer than two days. One would expect the greatest number of days of disabling illness to occur in winter, especially in the winter (January and February) of 1919 when the second wave of epidemic influenza struck the localities where the employees of the company reside; but the percentage of working time lost on account of sickness in January and February was as low as it ever got during the year, except for the summer months, June, July, and August. The amount of sickness, it may be noticed, was considerable in March, and it is therefore quite probable that the high percentage shown for April was due in part to cases that were contracted during the middle or latter part of March and extended well into April, thus causing more days of disability in April than in the month of onset. Lack of definiteness about this point shows the need for knowing the number of new cases of disabling illness each month, as well as time lost, to represent the severity of sickness.

The Rate of Absenteeism as a Factory Health Barometer.

A question which has come up for consideration in the study of industrial hygiene is whether the total time lost for all causes of absence per employee is any index of deleterious working conditions. It has been argued that a large amount of time lost on account of sickness would perceptibly raise the absence rate, and thus make it possible for one to discover what working conditions were reacting unfavorably on health, merely from a knowledge of the annual number of days of absence per person in each principal occupation or department. This question may be determined by correlating the sickness rate with the rate of absence from all causes. If, in a considerable number of instances, a high sickness rate is accompanied by a high rate of absenteeism and a low sickness rate is coincident with good attendance, the coefficient of correlation will be high. The computation which covered 24 departments revealed a coefficient of 0.52 in the scale in which 1.0 represents perfect correlation and 0.0 no correlation at all. The probable error was found to be ± 0.10. For correlation to be a practical certainty, the coefficient should be at least six times the size of the probable error.

It is obvious that there would be some correlation, since absence on account of sickness was, of course, included in total absence. It is therefore desirable to determine whether any relationship exists between the illness rate and the rate of absence for all causes except illness. So the days lost per employee per year on account of sickness were correlated with the days lost on account of all other reasons, and

the coefficient was found to be 0.30 ± 0.13, which means hardly any relationship at all.[1]

TABLE III.—*Absence rates for the principal causes of absence, and relative variations in the rates, by departments, in a large industrial establishment during 1919.*

Department symbol.	Working-days lost per employee on account of—			Industrial accidents.	Nonindustrial accidents.	Relative variations (index numbers).		
	All causes of absence.	Sickness.[a]	Personal reasons.[b]			All causes of absence.	Sickness.[a]	Personal reasons.[b]
A	36.22	6.84	29.28	.....	.....	221.1	142.4	275.2
B	27.68	4.25	22.28	0.29	0.87	169.0	88.5	209.4
C	25.52	8.20	17.06	.25	.01	155.8	170.8	160.4
D	21.31	5.75	15.41	.10	.05	130.1	119.7	144.8
E	21.24	7.90	12.68	.55	.11	129.7	164.5	119.1
F	19.29	1.87	15.39	1.70	.33	117.7	38.9	144.6
G	19.03	3.33	12.80	2.90	.....	116.2	69.4	120.3
H	17.39	4.88	12.30	.14	.08	106.2	101.6	115.6
I	16.94	4.17	11.10	1.67	.....	103.4	86.8	104.4
J	16.80	4.56	11.22	.82	.20	102.6	94.9	105.5
K	16.02	5.62	10.09	.28	.03	97.8	117.1	94.9
L	15.48	4.72	10.35	.24	.16	94.5	98.2	97.4
M	15.25	6.06	8.89	.26	.04	93.1	126.1	83.6
N	14.71	4.21	10.28	.11	.10	89.8	87.8	96.7
O	14.33	6.09	7.83	.34	.07	87.5	126.8	73.6
P	13.92	6.74	6.03	.28	.87	85.0	140.4	56.7
Q	12.92	4.96	7.13	.84	.....	78.9	103.2	67.0
R	12.77	3.77	7.68	1.31	.....	77.9	78.6	72.2
S	12.24	4.70	7.14	.39	.....	74.7	97.9	67.1
T	11.47	4.28	4.74	1.94	.50	70.0	89.1	44.6
U	11.40	4.99	6.15	.23	.01	69.6	103.8	57.8
V	9.23	3.29	4.79	.28	.86	56.3	68.6	45.0
W	6.19	3.13	2.55	.44	.07	37.8	65.2	24.0
X	5.78	.95	3.18	1.65	.....	35.3	19.8	29.8

[a] Includes only those cases which caused disability for more than two consecutive working-days.
[b] Includes cases of sickness of less than three (work-)days' duration.

When the sickness rate was compared with the rate of absence by months, the coefficient of 0.72 was obtained, the probable error being ± 0.09. This is high correlation and indicates the probability of similarity in the seasonal variations for sickness and absenteeism, though the fact is not conclusively determined, owing to the small number of instances, i. e., 12. It was not, however, as an index of seasonal changes, but of occupational or departmental conditions that the absence rate was to be used in the study of industrial hygiene. It seems apparent, therefore, that a large amount of absence in particular occupations or departments does not necessarily indicate unhealthful working conditions and high sickness rates, and good attendance may be indicative of a healthful environment, unless in particular instances it is found that the employees seldom stay away from work except for sickness. It may be objected that a conclusion is being drawn from conditions in only one establishment, but to this it may be replied that a real barometer should register the true conditions in *every* instance.

The graph in Figure 2 may make clear why the correlation between sickness and absenteeism was not particularly marked. Had correlation been perfect, line A, representing absenteeism, and line B,

[1] The sickness rate and the rate of absence for all causes except sickness, when correlated by months instead of by departments, showed a coefficient of 0.31 ± 0.18, which again indicates the lack of any very definite tendency for the sickness rate to fluctuate in sympathy with the rate of absence for all other causes.

representing sickness, would have coincided. Line C shows that it was not sickness but personal reasons which was the greater determinant of the absence rate.

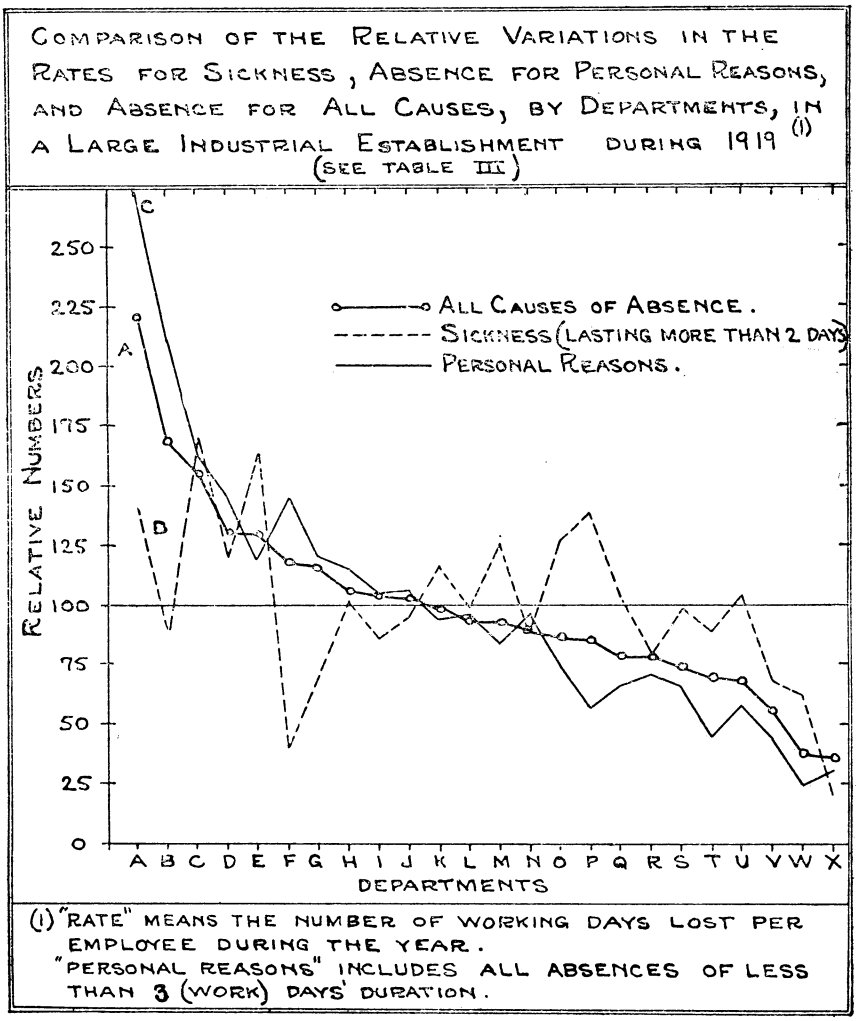

FIG. 2

Absence by Days of the Week.

Figure 3, showing the percentage of men and the percentage of women absent each day of the week, pictures the company's experience during the last five months of 1919. Women lost 78 per cent more working time than men, and absented themselves to a greater extent than the males every day in the week. Monday was the day of poorest attendance by both sexes; but there was gradual improvement until Thursday in the case of the women, and until Friday with the men, when the curves took an upward turn.

TABLE IV.—*Number and per cent of employees absent from work, by days of the week, from Aug. 1 to Dec. 31, 1919.*

Day of week.	Average number of employees absent from work.		Per cent of employees absent from work.		
	Male.	Female.	Male.	Female.	Both sexes.
Monday	225	203	5.11	8.65	6.34
Tuesday	207	187	4.70	7.97	5.83
Wednesday	189	184	4.29	7.84	5.53
Thursday	183	175	4.15	7.46	5.30
Friday	181	191	4.11	8.14	5.51
Saturday	209	198	4.75	8.44	6.03
Average	199	189	4.52	8.06	5.75

Average number of employees: Male, 4,402; female, 2,346.

The Age Factor in Disability.

In accounting for variations in the frequency and duration of disability, both American and European experience with sickness insurance has demonstrated that age is the most important factor. The sickness rates for different age groups among the company's employees are shown in the graph in Figure 4, which discloses a marked increase in sickness among persons of 50 or more years of age.

TABLE V.—*Working-days lost on account of sickness, by different age groups—Morbidity experience of the employees of a large industrial establishment during 1919.*

Age period.	Number of employees.	Number of disabled employees.[a]	Working-days lost.[a]	Days lost per employee per year.[a]	Days lost per disabled employee.[a]
All ages	6,748	2,534	36,171	5.36	14.27
15 to 21	2,421	771	12,675	5.24	16.44
25 to 34	2,318	949	11,463	4.95	12.08
35 to 44	1,170	479	6,213	5.31	12.97
45 to 54	593	208	3,059	5.16	14.71
55 to 61	194	94	2,013	10.37	21.41
65 and over	52	33	748	14.38	22.67

[a] Includes only those illnesses which caused disability for more than two consecutive working-days and refers to cases only; i. e., the same person may have been sick more than once.

The Sickness Rate According to Occupation or Department.

The illness rate for each principal occupation or department in a factory, mine, or store is needed in the intelligent study of industrial hygiene, and is very valuable as a guide in its proper administration. It is quite erroneous, however, to assume that a high sickness rate in any department or occupation is conclusive evidence of an unhygienic working environment. Any excess rate (the amount of sickness that is above a fairly determined norm) might be entirely accounted for by the age of the workers, by sex, by wrong home conditions, such as poor diet, household congestion, etc., or by an insanitary situation in the community. The influence of these important factors should

be eliminated by proper investigation before working conditions can properly be condemned as the cause of a high morbidity. These considerations should be regarded in the interpretation of any diagram like that shown in Figure 5.

It will be noticed that there is considerable variation in the amount of sickness in different departments, the rate ranging from less than one day of sickness per person per year in department X to more than

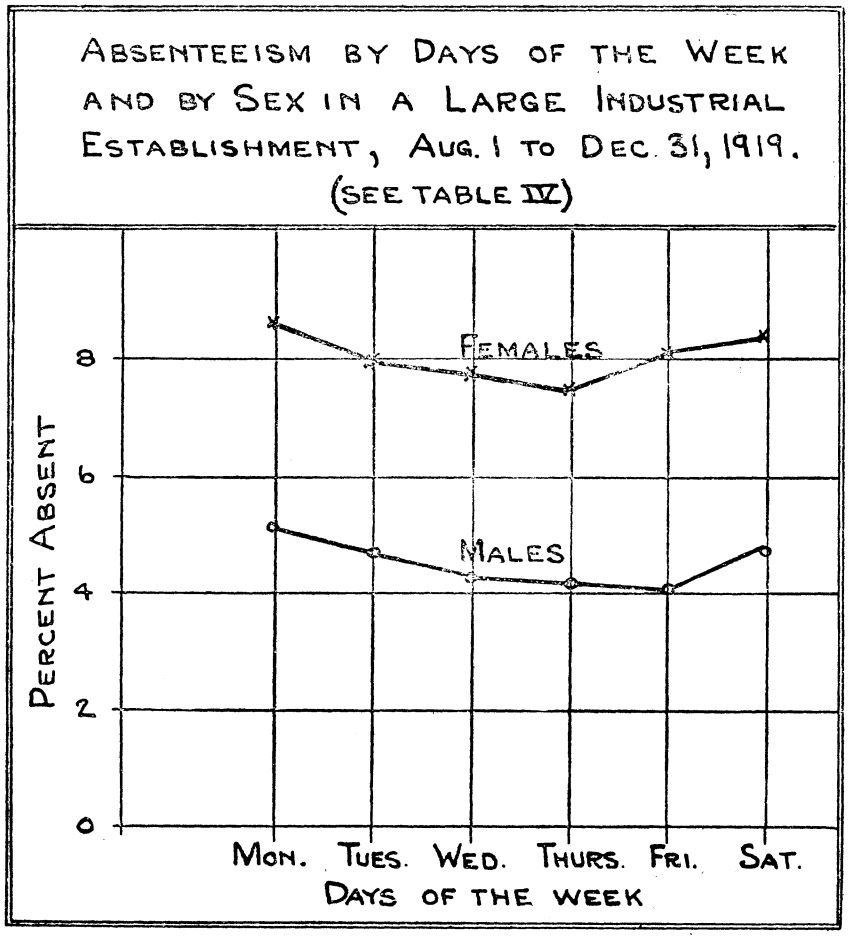

FIG. 3.

eight days in department C. If, however, the two departments having the highest rates and the two having the lowest rates be omitted for the moment, the range is greatly decreased and the regularity of the array becomes rather striking. The four departments showing big deviation from the average rate should be analyzed to determine the age, sex, and possibly nationality, composition of each as well as the number of cases, the time lost, and the nature of the illnesses causing disability.

Sickness Among Persons of Different Nationality.

Illness rates for the principal nationalities employed are presented below. The Americans numbered 3,340, Lithuanians 277, Canadians 378, Italians 978, Irish 459, and Armenians 324. Information as to nationality was obtained from the employment records which gave the answer to the question, "What nationality are you?" asked of all employees at the time of entering the service of the company. The nationality, therefore, unfortunately does not indicate whether the person was foreign born or not.

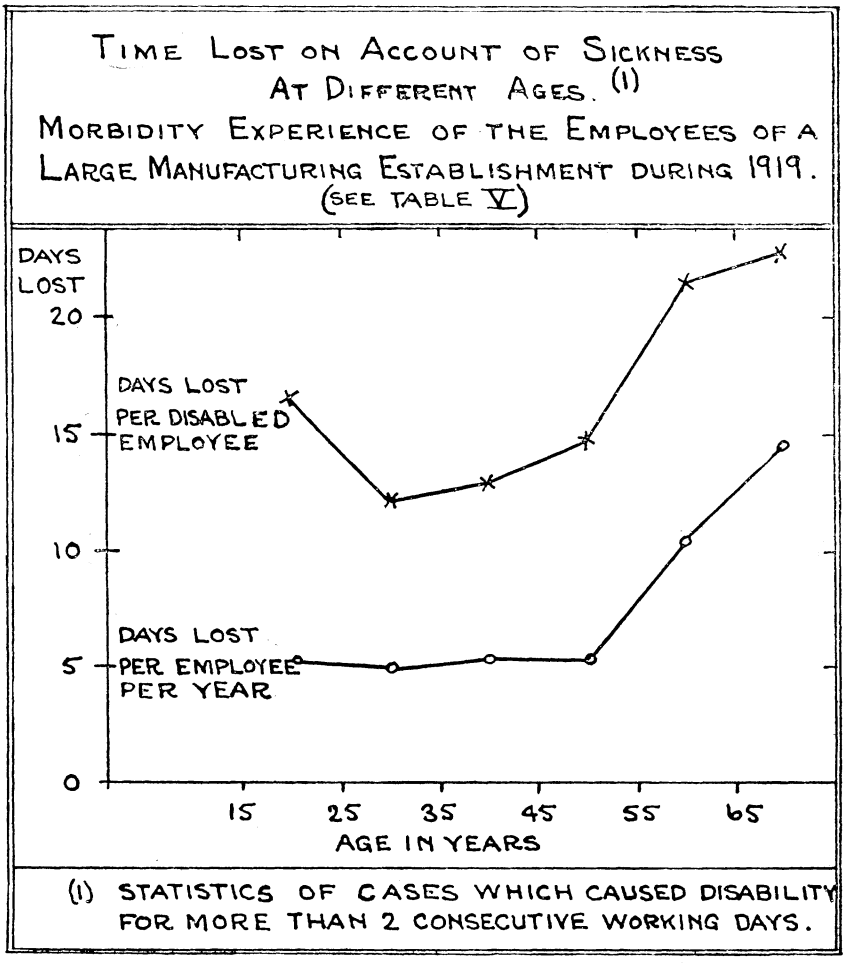

FIG. 4.

It would be premature to rejoice over the low morbidity rate shown for Americans until the facts of age and sex and the nature of the sickness producing the disability have been ascertained. The graph (Fig. 6), however, raises the interesting question whether the sickness experience of certain race stocks is similar to their mortality expe-

rience. Dr. Louis I. Dublin and Mr. Gladden W. Baker in a study of mortality in New York and Pennsylvania have concluded that the presence of the foreign stock has had the undoubted effect of increasing the total death rate in both these States, especially after the age of 45 is attained, and that the superior vitality of the native stock is fully demonstrated as to both sexes.[3]

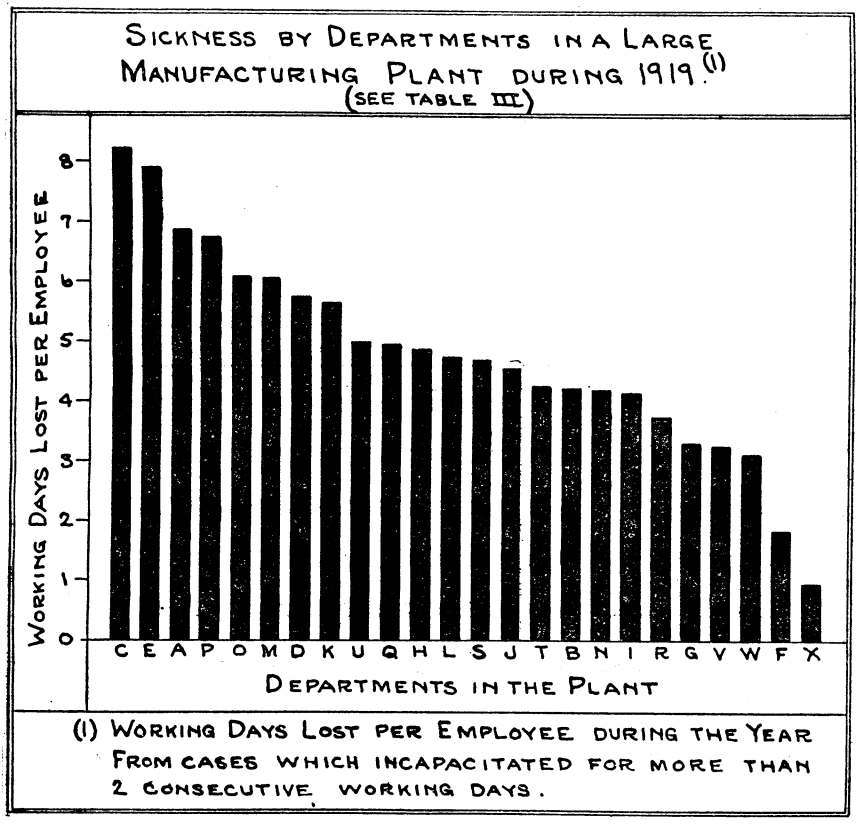

FIG. 5.

TABLE VI.—*Working days lost on account of sickness, by the principal nationalities employed, year of 1919.*

Nationality.	Number of employees.	Number of disabled employees.[a]	Working days lost.[a]	Days lost per employee per year.[a]	Days lost per disabled employee.[a]
American	3,340	1,992	14,290	4.28	7.17
Lithuanian	277	81	1,188	4.29	14.67
Canadian	378	153	2,153	5.70	14.07
Italian	978	503	6,334	6.48	12.59
Irish	459	227	3,177	6.92	14.00
Armenian	324	126	2,311	7.13	18.34

[3] Dublin, Louis I., and Baker, Gladden W., The Mortality of Race Stocks in Pennsylvania and New York, 1910: Am. Stat. Quarterly, March, 1920, p. 17.

[a] Includes only those illnesses which caused disability for more than two consecutive working-days, and refers to cases only; i. e., the same person may have been sick more than once.

If the morbidity rates for the Irish, Italians, Armenians, etc., should be shown by future studies to be actually higher than those for native Americans, as the present array suggests, it is probable that not only the relative lack of vitality of certain foreign nationalities will be found important in determining the morbidity as well as the mortality rates for industrial employees, but also that race habits and relatively low economic status will be found to be factors of equal if not greater importance in their effect on disease incidence and severity. Knowledge of the relationship between morbidity and mortality among persons of different nationality, especially when

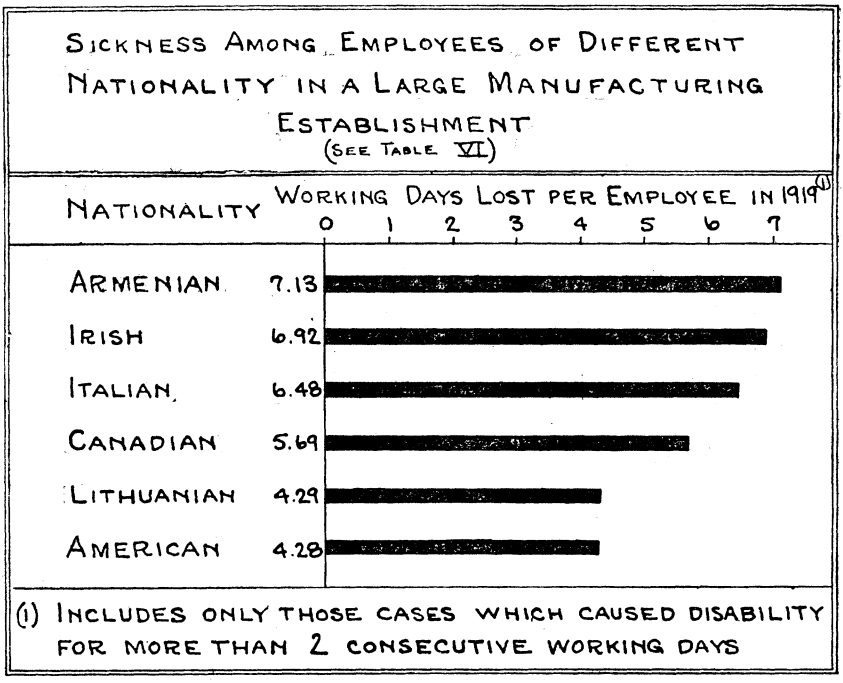

FIG. 6.

studied in relation to age and sex and other important conditions of physical status, home and working environment, would make for a more complete appreciation of what is involved in carrying on preventive work in the most effective way.

Only a few of the possible inquiries that a business organization may advantageously make in the study of its health problem have been mentioned above; but even these few statistics selected from the annual report of the service department of a single company indicate at least to some extent what fruitful fields there are to explore in the process of creating a healthy, stable body of workers and in conserving life in industrial communities.